XML

eXtensible Markup Language

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- eXtensible Markup Language
- World Wide Web Consortium (W3C)
- I.E. Legal XML QueryXML, Voice XML
- Promotes business to business exchange (B2B)
- Does not describe Formatting -It’s about content

- Uses any kind of information any kind of content

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What is XML?

- *eXtensible* - By applying Identifiers for elements of information in a neutral way, stored in a neutral form, independent of systems, devices and applications.

- *Markup* - For adding information to a document relating to its structure and/or content.

What is XML?

- *Language* - A standard methodology with formal syntax.....However
- XML is not a language but a toolkit for developing or defining languages
- A common syntax for expressing structure in data

How are SGML, HTML & XML Related?

- Standard Generalized Markup Language
- HTML is an application of SGML
- XML is a subset of SGML

Tags

- <address>
- <name>
- <title>Mrs.</title>
- <first-name>Air</first-name>
- <last-name>Documents</last-name>
- </name>
- <street>1234 Concord Street</street>
- <city>Anytown</city>
- <state>VA</state>
- <zipcode>45678</zipcode>
- </address>

Content

- <address>
- <name>
- <title>Mrs.</title>
- <first-name>Air</first-name>
- <last-name>Documents</last-name>
- </name>
- <street>1234 Concord Street</street>
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- <zipcode>45678</zipcode>
- </address>

XML is Tags and Content
A Hierarchical Data Representation
A Tree Structure Data Representation

Why Do We Need XML?

- Interoperability
- Info can be separated from the way it is presented
- Information can be presented in a variety of ways depending on the device the end user has.

Why Do We Need XML?

- Future Web developments hinge on the use of XML W3C
  - Dependence on a single, inflexible document type (HTML) which was being abused for task for which it was never designed
  - SGML was too complex to fill the gap

HTML vs. XML

- Mrs. Air Documents
-
- 1234 Concord Street
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HTML vs. XML

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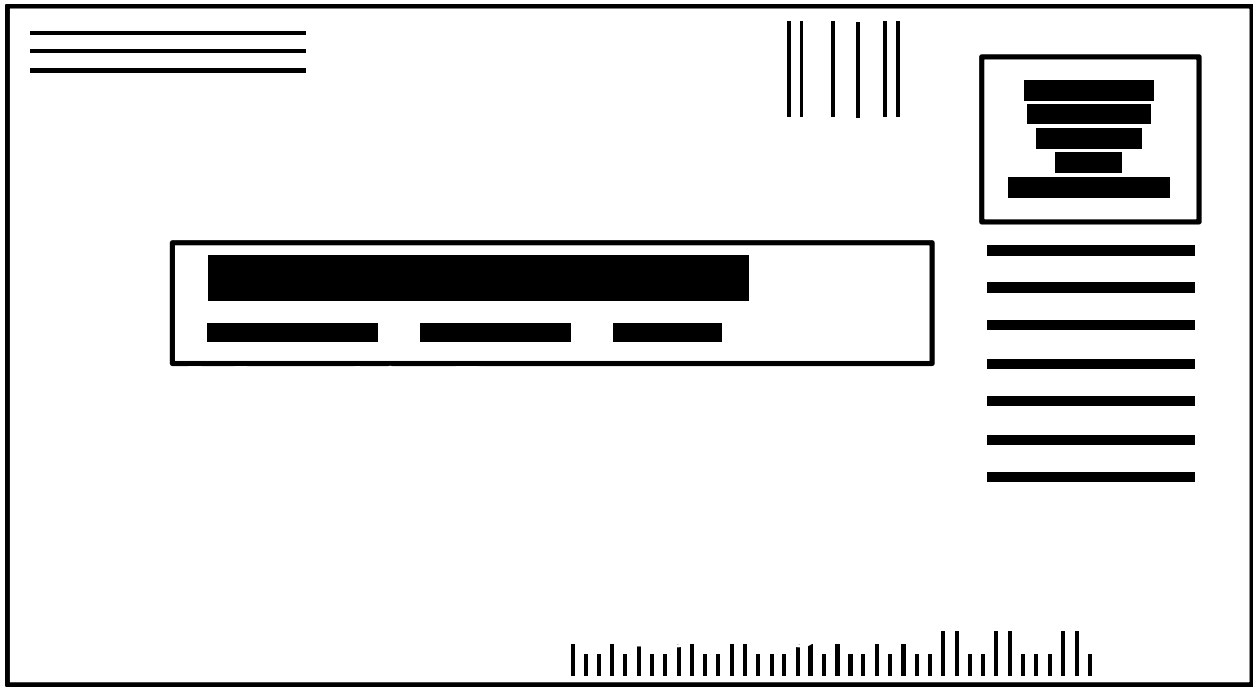


OMB's 24 e-government Initiatives

Implementing the
President's Management Agenda for E-Government

E-Government Strategy

Simplified Delivery of Services to Citizens

February 27, 2002

Why is XML Important?

- Does not need a specific application
- Perpetual preservation of Information
- Could be future standardized mechanism for the exchange of data

How Does It Work?

- XML Parser
- XML Processor

- XML does not provide an application programming interface (API). (Just passes data to the application)

What is a DTD?

- DTD - Document Type Definition

- A set of syntax rules for tags
  - What tags you can use in a document
  - Where the tags appear
  - Which tags can appear inside other tags
  - A set of constraints for documents

DTD vs. Schema

- DTD content models are closed and can’t reflect the openness XML supports.
- DTD doesn’t support data types beyond the 10 primitive types.
- It can’t express rich data types allowed in XML Schema

Schema

- Microsoft proposed an alternative approach to DTDs called schema
  - Like DTDs, schema provide the rules of a document and indicate what tags are used.
  - Unlike DTDs, schema can define data types.
  - Designed to replace and amplify DTDs

Schema

```
<?xml version="1.0" encoding="UTF-8"?>

<!ELEMENT po (customer-id , item-ordered+ , order-date)>

<!ELEMENT customer-id (#PCDATA)>

<!ELEMENT item-ordered EMPTY>

<!ATTLIST item-ordered  part-number CDATA  #REQUIRED
                        quantity    CDATA  #REQUIRED >
<!ELEMENT order-date EMPTY>

<!ATTLIST order-date  day   CDATA  #REQUIRED
                      month CDATA  #REQUIRED
                      year  CDATA  #REQUIRED >
```

Schema

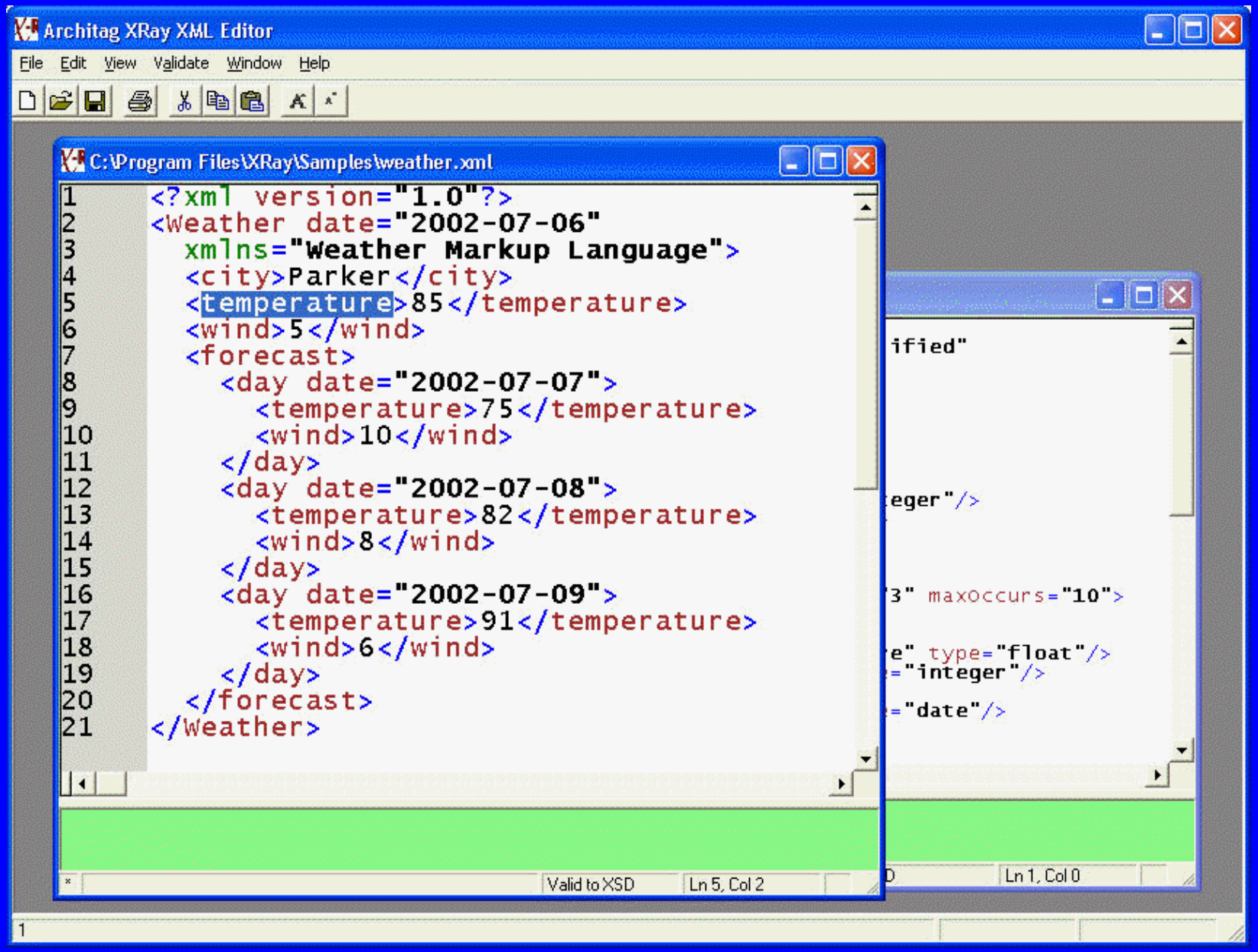
```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2000/10/XMLSchema">

  <xsd:element name="po">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element ref="customer-id"/>
        <xsd:element ref="item-ordered" maxOccurs="unbounded"/>
        <xsd:element ref="order-date"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="customer-id" type="xsd:string"/>

  <xsd:element name="item-ordered">
    <xsd:complexType>
      <xsd:attribute name="part-number" use="required">
        <xsd:simpleType>
          <xsd:restriction base="xsd:string">
            <xsd:pattern value="[0-9]{5}-[0-9]{4}-[0-9]{5}"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
      <xsd:attribute name="quantity" use="required" type="xsd:integer"/>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="order-date">
    <xsd:complexType>
      <xsd:attribute name="day" use="required">
        <xsd:simpleType>
          <xsd:restriction base="xsd:integer">
            <xsd:maxInclusive value="31"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
      <xsd:attribute name="month" use="required">
        <xsd:simpleType>
          <xsd:restriction base="xsd:integer">
            <xsd:maxInclusive value="12"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
      <xsd:attribute name="year" use="required">
        <xsd:simpleType>
          <xsd:restriction base="xsd:integer">
            <xsd:maxInclusive value="2100"/>
          </xsd:restriction>
        </xsd:simpleType>
      </xsd:attribute>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```


Architag XRay XML Editor
File Edit View Validate Window Help
C:\Program Files\XRay\Samples\weather.xml
1 <?xml version="1.0"?>
2 <Weather date="2002-07-06"
3 xmlns="Weather Markup Language">
4 <city>Parker</city>
5 <temperature>85</temperature>
6 <wind>5</wind>
7 <forecast>
8 <day date="2002-07-07">
9 <temperature>75</temperature>
10 <wind>10</wind>
11 </day>
12 <day date="2002-07-08">
13 <temperature>82</temperature>
14 <wind>8</wind>
15 </day>
16 <day date="2002-07-09">
17 <temperature>91</temperature>
18 <wind>6</wind>
19 </day>
20 </forecast>
21 </Weather>
Valid to XSD
Ln 5, Col 2
Ln 1, Col 0

Schema

- Example
  - A DTD might have a tag designated as <PRICE>, but the content contained within that tag could be a number or a character string. A schema would force you to enter a number.
- DTD <$8.00 or eight dollars>
- Schema <$8.00>

Stylesheets

- Provides hints and algorithms for rendering or transforming the data in the XML document.
- XSLT Extensible Stylesheet Language can transform from one XML format to another including HTML or plain text.

For More XML Information:

- For basic Information on XML: http://www.xml.org/xml/resources_focus_beginnerguide.shtml
- W3C: http://www.w3.org/
- Robin Cover's extensive list of online reference material and links to software: http://xml.coverpages.org/

QUESTIONS?